

# ACP-ACTAE Project (2017-2018) Agroecological Crop Protection



[www.agriculture-biodiversite-oi.org/en/ACP-ACTAE](http://www.agriculture-biodiversite-oi.org/en/ACP-ACTAE)



## Foreword

The ACP-ACTAE project was funded by AFD (Agence Française de Développement) within the ACTAE regional project ("Towards Agroecology Transition in the Mekong Region"). It was carried out between 2017 and 2018 in South East Asia and it gathered numerous partners from Vietnam, Myanmar, Cambodia and Laos.

The ACP-ACTAE project was devoted to open a new page on Agroecology in the CANSEA platform activities in South East Asia: Agroecological Crop Protection (ACP) corresponds to the declension of Agroecology to Crop Protection. The ACP-ACTAE project has proposed in 2 years a significant number of activities with the partners that are presented in this report and which are, for the most part, available online.

This project has made it possible to build a solid base of exchanges and partnerships, making it possible to envisage immediate and concrete collaborations between CIRAD and partners in South-East Asia (particularly in Vietnam), in the field of Agroecological Crop Protection.

Jean-Philippe Deguine (Cirad), coordinator of the ACP-ACTAE project



## Acknowledgements

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We also are very grateful to AFD (Agence Française de Développement) for funding our project.

Finally, thanks to all of the participants of the different countries who have been involved in this project for their kind and useful contributions.

Jean-Philippe Deguine (Cirad), coordinator of the ACP-ACTAE project



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## Introduction

This final report presents the context, the objectives, the technical and financial results and the deliverables of the Agroecological Crop Protection (ACP) project, carried out between 2017 and 2018 in South East Asia. More information is available on the webpage of the ACP-ACTAE project:

[www.agriculture-biodiversite-oi.org/en/ACP-ACTAE](http://www.agriculture-biodiversite-oi.org/en/ACP-ACTAE)

This ACP-ACTAE project was funded by AFD (Agence Française de Développement) within the ACTAE regional project ("Towards Agroecology Transition in the Mekong Region"). This ACP-ACTAE project was coordinated by Jean-Philippe Deguine (Cirad, UMR PVBMT) and it gathered numerous partners from Vietnam, Myanmar, Cambodia and Laos.

The ACP-ACTAE project presented below was devoted to open a new page on Agroecology in the CANSEA platform activities in South East Asia. ACP corresponds to the declension of Agroecology to Crop Protection. It is an essential field of agroecosystem management, entirely coherent and complementary with Conservation Agriculture (and agroecological soil management). It is based on two main axes: i) soil health and ii) biodiversity. ACP benefits the CANSEA countries (Vietnam, Myanmar, Laos and Cambodia) and more generally countries in the Asian zone. This project also represented an opportunity to develop new links and collaborations between SEA and other parts of the world (Europe, Indian Ocean).

Most of the ACP-ACTAE information, documents, videos and results are available on the CANSEA Website:

<http://cansea.org.vn>

We suggested to consider this ACP-ACTAE project as a framework to start basic activities (survey, exchange of information, training) and as an advantage to build further collaborations. The overall objective of the ACP-ACTAE project was, by starting and promoting activities in a new field of Agroecology, to contribute to the global development of Agroecology in SEA.

## **1. ACP-ACTAE project & CANSEA Platform**

CANSEA is a network & a platform in partnership for research and training keen to implement Agroecology and Conservation Agriculture in South East Asia. Agroecological Crop Protection (ACP) is a new thematic in CANSEA, opening a new area in research and training. It corresponds to a demand of stakeholders in agriculture in South East Asia and an increasing issue.

ACP-ACTAE project corresponds to the main stream of evolution of CANSEA, i.e. opening to other fields of Agroecology in the future. This ACP-ACTAE project took place in the 2016 Grant ACTAE CANSEA process, and it resulted from discussions with partners in CANSEA countries. Before submission, this proposal was consolidated with CANSEA partners. All CANSEA countries were concerned by this proposal, which included participation in workshops or meetings, but we had chosen to focus activities on the priorities of ACP thematic in certain zones due to the limited amount of funds in the ACTAE Grants. Thus, this ACP-ACTAE project mainly concerned two countries, Vietnam and Myanmar, with links with neighboring countries.

## **2. ACP-ACTAE project in the SEA context**

Agroecology, as a scientific discipline, a social movement and a set of agricultural practices, is promoted around the world, in Asia and particularly in SEA. In this geographic zone, the Food and Agriculture Organization of the United Nations (FAO) organized a Regional Meeting on Agroecology for Asia and the Pacific in November 2015 in Bangkok in order: i) to highlight existing best practices in the region, as well as challenges and strategies to overcome them and ii) to create the conditions aiming at strengthening Agroecology at the country-level, while enhancing the opportunities for regional integration.

In this respect, the CANSEA platform, gathering research institutes and universities from six Asian countries now has to play a key role in SEA. Until now, the activities of the CANSEA platform focused on research and training in Conservation Agriculture, particularly on degraded soils restoration and sustainable intensification and diversification of conventional cropping systems. CANSEA enters a new phase and its future orientations aim at enlarging the scope of activities to the Agroecology practices (Conservation Agriculture being one among them), to develop activities in partnership and

at moving from a network to a research and training platform on Agroecology for SEA. The development of scientific activities through a research platform will involve CANSEA members already working on Conservation Agriculture and new scientific members working on complementary Agroecology approaches in partnership with extra researchers.

The global regional ACTAE project aims at accompanying the agroecological transition in SEA. Its purposes are to support networking of all categories of stakeholders, to facilitate synergies between different approaches and partners, to promote Agroecology practices to small-scale farmers, to consumers and policy makers.

This orientation needs both to reinforce the activities related to Conservation Agriculture, to facilitate exchanges and synergies between partners in the SEA zone to get a better visibility and open activities to new fields of Agroecology approaches. The ACP project aims at opening a poorly unexplored field of Agroecology, in the field of Crop Protection, which is entirely coherent with the approach developed in Conservation Agriculture.

Intensive agriculture, based on ‘green revolution’ practices such as monocultures, agro-chemical inputs and intensive tillage with high level of fuel consumption, has been implemented in many countries around the world to meet the rapidly growing needs of global populations and markets. Yet, agricultural intensification also has devastating effects on the environment, affects farm profitability and affects human health, of farmers and consumers. In the four ACTAE countries concerned by the ACP-ACTAE project,, the free availability and especially the non-guided use of chemically-synthesized pesticides now poses real social problems and is having devastating consequences for wildlife and local’s biodiversity by its excessive utilization by farmers. Such a situation can only be remediated by a paradigm shift, an increased attention to applied (on-farm) research and grower education, and a deliberate promotion of practices that safeguard nature and the environment. In Asia, the oldest example of ACP pertains to the conservation of weaver ants (*Oecophylla smaragdina*) by farmers in ancient China and Vietnam, to control insect pests in citrus orchards. Unfortunately, this “heritage” became forgotten and underutilized with the easy availability and utilization of chemical pesticides promoted by the intensive agriculture.

### **3. What is Agroecological Crop Protection (ACP)?**

Crop Protection has relied for a long time on agrochemicals but is now at a defining moment. Although pesticides have been condemned for many years, the problems encountered with this type of Crop Protection are becoming more frequent and acute: inefficiency in many situations; resistance to pesticides; soil, water, and air pollution; hazards to human health; and loss in biodiversity. The challenge is now to move from this chemical-based approach to that of pest prevention with more balanced and sustainable agroecosystems. This approach is based on agroecological and spatio-temporal management of plant and animal communities at extended scales (Ferron and Deguine, 2006).

ACP is the declension of Agroecology to Crop Protection and it is at the crossroad of Agroecology and Crop Protection (Deguine and Ratnadass, 2017). It aims at “replacing” chemicals, which have negative effects on the environment and on human health, by the services offered by functional biodiversity above and below soil surface (Sarhou et al., 2017). It is a system of Crop Protection based on the science of Agroecology. By focusing on preventive measures, it aims at establishing a bioecological balance between plant and animal communities within an agroecosystem in order to prevent or reduce the risk of infections or outbreaks of pests’ outbreaks. Among the conventional techniques used as part of Integrated Pest Management (IPM), ACP focuses on the optimization of cropping practices and of management techniques of plant populations to promote the maintenance or the creation of habitats for useful indigenous wildlife and/or counter nuisances affecting flora and fauna. Agroecological protection involves managing plant communities (crops and uncultivated plants in the agroecosystem as a whole) and animal populations such as pests and various beneficial arthropods. Trophic relationships, tritrophic interactions and trophobiosis processes are particularly important to be taken into account in this respect.

ACP is based on two axis: i) enhance biodiversity (vegetal/animal) and ii) soil health. It is therefore very consistent and complementary to Conservation Agriculture, devoted to agroecosystem soil management. ACP is another field of agroecosystem field study and management, devoted to prevention and management of pests. It is now well-documented (Deguine et al., 2017). The phytosanitary strategy is structured according to the following elements: i) protection based on scientific principles of Agroecology (interactions, ecological functioning); ii) practices based on

biodiversity, soil health and communities management; iii) priority to preventive measures. The three pillars of implementation of ACP are sanitation, habitat management and biological control. New scales of intervention are considered, in terms of both space and time in accordance with participatory, global and systemic approaches.

The implementation of the ACP principles to the field reality have shown good results in different parts of the planet and some success stories have been described, for example in vegetable crops (Deguine et al., 2015) or fruit crops (Deguine et al., 2018). Keys of agroecological transition are now available (Deguine et al., 2017) and can be adapted to different contexts, for example SEA context.

## **4. Objective of the ACP-ACTAE project**

### **ACP project: answering to the need and the demand of Agroecology in Crop Protection in framework of the CANSEA platform**

During the CANSEA Steering Committee held in Bangkok (Thailand) in November 2015, the perspective to develop ACP in CANSEA scope have been proposed and accepted in accordance with identified needs from different partners. Two ways were identified: i) to develop Agroecological Crop Protection, the field of Agroecology in Crop Protection, with and besides Conservation Agriculture, ii) to contribute to the CANSEA platform with activities of training, applied research and academic education with CANSEA partners.

The ACP project will contribute to the opening of a new approach of agroecological practices in SEA in the field of Crop Protection. It is necessary and relevant to stress the coherence and complementarity of ACP with the pillars of Conservation Agriculture, particularly with the priority given to soil health and to biodiversity in the agroecosystems. In this respect, a scientific issue of this project is to contribute, to structure, to promote and to implement interface between agroecological soil management and agroecological biodiversity management. Of course, ACP interests the countries involved in the ACTAE regional project (Vietnam, Myanmar, Laos, Cambodia) and more generally countries in the Asian zone (members or not yet of CANSEA network).

We suggested to consider this project as a framework to start first and basic activities (survey, exchange of information, training) and as a lever to build a medium-term ACP research collaboration, with further technical and financial partners.

### **Overall and specific objectives of ACP project**

The development of Agroecology in the field of Crop Protection in South East Asia can be divided in 2 phases, as follows:

- 2017-2018 → ACP-ACTAE project
  - to have the same level of information on ACP (sharing concerns, exchanging information, writing collectively, training, identifying axis of a MT project in partnership, ...)
- After 2019 → medium term collaborations
  - to initiate a perennial partnership in the region
  - to implement durable activities in ACP (research, teaching, supervising, training, dissemination of knowledge, ...)

The overall goal of the ACP project was, by starting and promoting activities in a new field of Agroecology, to contribute to the global development of Agroecology in SEA. This project was coherent with the Conservation Agriculture. It was also in accordance with the regional dynamics in Agroecology (see FAO meeting in Bangkok in 2015). Among the issues, ACP aimed at placing agroecological issues at the center of concerns, while maintaining or enhancing socioeconomical considerations of small-scale farmers, and taking into account respect of environment (particularly biodiversity) and human health.

Thus, the three specific goals of this ACP project were the following ones:

- Making a state of the art of Crop Protection in the area and identifying the priority problematics of Crop Protection that are to be taken into account;
- Training and information exchanging on ACP for different stakeholders (researchers, extension officers, stakeholders, growers);
- Building the foundation of an ACP medium term project, integrating research, training, education and extension support, with the partners of the CANSEA area.

The three axis of the ACP-ACTAE project resulted from these three specific objectives listed above and gave five actions that are presented in Figure 1.

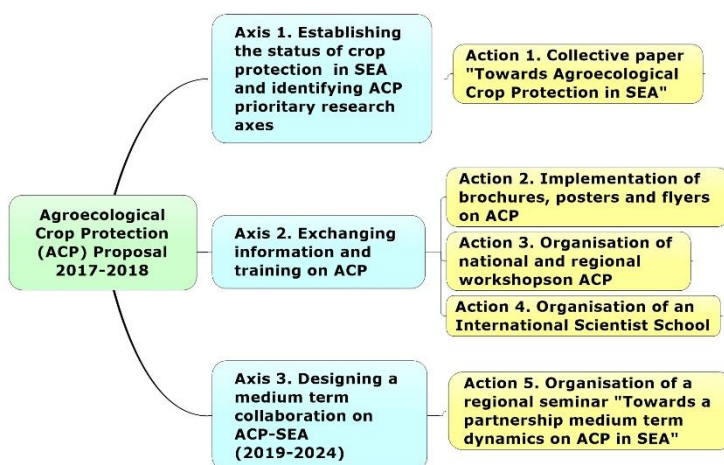


Figure 1. Five Actions of the ACP project

Meetings and seminars planned in this project were destined to all ACTAE countries (Vietnam, Myanmar, Laos, Cambodia), such as workshops and Scientist School. However, taking into account the limited amount of the budget, this ACP project particularly focused on developing partnership with two countries: Vietnam and Myanmar.

## **A co-designed ACP-ACTAE project**

This ACP project was discussed, detailed and consolidated by the partners met during the first and previous contacts, mainly in Vietnam and Myanmar. At this occasion, meetings were organized with different institutions of these two countries. Local contacts were identified to be the focal persons to transfer information and to exchange with other colleagues in the country (or in the part of the country for Vietnam).

The five actions of the project were concrete answers to the concerns of the partners and agricultural stakeholders. The main targeted countries were Vietnam and Myanmar. However transversal activities, such as for example workshops and seminars, aimed also to involve partners of Laos and Cambodia.

Before the project, in Vietnam, the following partners discussed on this ACP-ACTAE project: MARD-VAAS (Ministry of Agriculture and Rural Development, Vietnam Academy of Agricultural Sciences), MARD-PPD (Ministry of Agriculture and Rural Development, Plant Production Department), SOFRI (Southern Fruit Research Institute), PPRI (Plant Protection Research Institute), SFRI (Soils and Fertilizers Research Institute), NOMAFSI (Northern Mountainous Agriculture and Forestry Science Institute), HNUE (Hanoi National University of Education), VOAA (Vietnam Organic Agriculture Association), FAVRI (Fruits and Vegetables Research Institute), VNUA (Vietnam National University of Agriculture) and CTU (Can Tho University). In Myanmar, the partners who confirmed their interest and involvement on the basis of the project were the Ministry of Agriculture, Livestock and Irrigation (MoALI) from which the Department of Agricultural Research (DAR), Land Use Division (DOA-LUD) and Plant Protection Department (DOA-PPD) and the Yezin Agricultural University (Plant Protection Division, Department of Plant Pathology). In addition, partnerships with Laos and Cambodia were consolidated in the planned workshops of the ACP-ACTAE. Researchers of Laos and Cambodia planned to attend the regional workshop and Scientist School in South Vietnam.



## **5. Budget of the ACP-ACTAE project and financial report**

After the submission of the proposal, the ACP-ACTAE project was granted and a budget of 33,000 US\$ (about 31,500 €) was funded by AFD. Finally, the total budget of the ACP-ACTAE project was 49,200 US\$ with co-funding. The demand to ACTAE Grant represented 67 % (33,000 US\$) and co-funds reached to 33 % (16,200 US\$). This budget was funded to cover the period from 1<sup>st</sup> January 2017 to 30<sup>th</sup> June 2018 in accordance with the budget described in the Letter of order (annex 1). The different activities planned were collective papers, flyers, brochures and posters, regional meetings, schools and workshops on ACP.

In addition, taking into account that the ACP-ACTAE project could achieve more activities than planned, at the beginning of 2018, an additional budget (23,500 €) was funded by AFD, to support the International Scientist School held in Can Tho (Vietnam) in March 2018, different activities and deliverables of the ACP-ACTAE project. See addendum to letter of order (annex 2).

The Table 1 summarizes the different expenses of the project.

Table 1. Expenses of the ACP-ACTAE project (2017-2018)

<b>Expenses for workshops and International Scientist Schools</b>	<b>in USD</b>
WS 1 – Hanoi (national WS in Vietnam)	4.045,00
WS 2 – Nay Pyi Taw (national WS in Myanmar)	2.670,00
WS 3 – My Tho (regional WS in Vietnam)	11.781,36
ISS ACP Italy (Dr Nguyen Thi Ngoc Truc)	3770,89
ISS ACP Can Tho	17.676,04
<b>S/Total</b>	<b>39.943,29</b>
<b>Training of Vietnamese researchers at CIRAD in Reunion</b>	
2 researchers (Tickets, Hotel, Perdiem, Visa)	5.782,74
<b>S/Total</b>	<b>5.782,74</b>
<b>Production of deliverables for communication on ACP</b>	
Video in Vietnam on weaver ants (March 2018)	989,13
Designing and printing Brochure ACP and Fruit Flies flyers	2.500,00
Designing and printing posters (ACP on fruit orchards/ beneficiaries)	1.500,00
Producing augmentoriums for field trials	2.500,00
Designing and printing Weaver ant guide and movie (DVD)	2.500,00
Expenses for English translation (717,00 €)	613,66
Expenses for translation of ACP brochure in Khmer, Burma and Lao languages	900,00
<b>S/Total</b>	<b>11.502,79</b>
<b>Participation to the final ACTAE regional conference on Agroecology (Siem Reap, 08 to 11 November 2018)</b>	
Ticket + hotel + Perdiem for 6 researchers (3 from Vietnam, 1 from Cambodia, 1 from Laos, 1 from Myanmar)	
Tentative budget	4.100,00
<b>S/Total</b>	<b>4.100,00</b>
Fluctuation for exchange rate between Euros and US dollars	<b>571,18</b>
<b>TOTAL (33.000,00 USD + 23.500,00 EUR)</b>	<b>61.900,00</b>

## **6. Results and deliverables**

### **Collective papers on Agroecological Crop Protection in South East Asia**

Exchanges that occurred in the different actions of the ACP-ACTAE project with area partners allowed identifying key phytosanitary issues considered as priorities. These have then been declined, in a collective and participatory manner, as bases for collective reviews on “Crop Protection and perspectives”. Instead of designing a regional paper, the choice was done to design two national papers: one in Vietnam, one in Myanmar. For each country, a structure of a paper and a repartition of the part contributions were proposed. The work is still in progress. Annex 3 shows, as an example, the plan of the paper and the repartition of the activities in the case of Myanmar. The structure of the collective Vietnamese paper is given in the minutes of the Hanoi ACP Workshop held in April 2017.

### **Implementation of brochures, flyers and posters on Agroecological Crop Protection in SEA**

The first step of the second axis of the ACP project aimed at designing and implementing brochures and flyers on ACP, in English and in national languages. This information was devoted to researchers, extenders, donors, and more generally, to stakeholders who want to know what Agroecology and ACP are. The following deliverables have been designed, written and edited:

- 1 brochure on Agroecological Crop Protection (4 pages, English, Vietnamese, Burmese, Khmer and Lao)
- 2 Flyers on Main Fruit Fly in Vietnam (1 page, English and Vietnamese)
- 5 posters on conservation biological control (1 page, English and Vietnamese)
- 1 poster on beneficials (1 page, English and Vietnamese)

These brochures, flyers and posters are now available and are going to be disseminated. Annex 4 shows as examples the ACP brochure in English (first page), a Fruit Fly flyer in Vietnamese, a poster on predators in an orchard, a poster on protecting beneficials. This action has been carried out with partners from Myanmar, Vietnam, Laos and Cambodia.

### **Producing augmentoriums in Vietnam for Agroecological Management of Fruit Flies**

Some dozens of augmentoriums have been produced in Vietnam, in order to implement further experiments on agroecological management of fruit flies on fruits and vegetables in Mekong Delta. This technique is used both for sanitation biological control.

### **Organization of three national and regional workshops (Vietnam and Myanmar, April-May-August 2017)**

Two national and one regional workshops were dedicated to gathering partners on the same level of information, both on the current working research axes in Crop Protection and on the knowledge of ACP and its ins and outs. These workshops were made up of training on ACP (around the following questions: What is ACP? What are the experiences available? What are the keys of the agroecological transition?), exchange of information on the status of Crop Protection regional priorities and local research axis, field trips and visits, discussion on the progress of collective paper (action 1) and contribution to the identification of future orientations and area of work for further collaboration (action 5). These workshops also provided information to help identify candidates as participants of the International Scientist School (action 4).

Three ACP-ACTAE Workshops were organized:

- A national WS in Hanoi (Vietnam, 25-26 April, 2017), 24 participants, 15 organizations
- A national WS in Nay Pyi Taw (Myanmar, 3-5 May, 2017), 40 participants, 5 organizations
- A regional WS in My Tho (Vietnam, 29-31, August 2017), 36 participants, 20 organizations

The workshops were performed jointly by local partners (VAAS and NOMAFSI in Hanoi, MOALI in Nay Pyi Taw and SOFRI in My Tho) and by CIRAD. Training material were prepared and distributed to participants and will be the basis for designing the ACP brochure (see Action 2) and a transfer assistance tool for field workers.

The contents of the WS were: Background; Agroecological Crop Protection; ACP-ACTAE project and Workshop relevance; Program of the Workshop (with plenary session, working groups, field trip); Organization Committee; Participants and institutions; List of institutions; Structure and progress of the ACP-ACTAE project; Presentations; Annexes. After each WS, a USB key was given to each participant, containing all the presentation files and some photos.

The minutes of these three WS were published and sent to all the participants. See annex 5.

- Deguine J.-P., 2017. Minutes of the ACP-ACPTAE Workshop. Hanoi, Vietnam, 25-26 April 2017, 44 pp.
- Deguine J.-P., 2017. Minutes of the ACP-ACPTAE Workshop. Nay Pyi Taw, Myanmar, 3-4 May 2017, 42 pp.
- Deguine J.-P., 2017. Minutes of the International ACP-ACPTAE Workshop. My Tho, Vietnam, 29-31 August 2017, 16 pp.

<b>Participation of a colleague from Vietnam to the International Scientist School held in Volterra (Italy), 11-16 February 2018</b>
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In February 2018, an International Scientist School (ISS) was organized in Europe (Italy) on ACP. It was jointly organized by INRA (J.-N. Aubertot) and CIRAD (JP Deguine), with the support of the ENDURE European network in Crop Protection. Participants from 10 countries, including PhD students as well as postdocs, junior and senior researchers working in Africa, Asia, South America, Central America and Europe, attended this ISS on Agroecological Crop Protection (ACP), which ran from February 11<sup>th</sup> to 16<sup>th</sup>, 2018.

The ACP-ACTAE project has supported the participation of Dr Nguyen Thi Ngoc Truc (Sofri, Vietnam) to this International Scientist School in Volterra (Italy). She attended this ISS as a student and this experience allowed her to attend, as a lecturer, the Twin ISS in Can Tho (Vietnam), 11-16 March 2018.

<b>Organization of ACP International Scientist School (Can Tho, Vietnam, 11-16 March 2018)</b>
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At the beginning of the ACP-ACTAE project, we had planned to organize a Twin International Scientist School on ACP, adapted to the context of the SEA. Drawing inspiration from the ISS held in Volterra (Italy), this Twin ISS was staged in Can Tho, Vietnam, in March 2018 (11-16), providing the opportunity for 33 participants to learn more about the ACP approach, which is seen as providing important benefits for crop protection in South-East Asia.

To illustrate the link between the two ISS (Italy and Vietnam), Dr Nguyen Thi Ngoc Truc (Sofri, Vietnam) attended the ISS in Italy as a participant, and the attended the ISS in Vietnam as a lecturer (<https://www.youtube.com/watch?v=9sjK2fkCz7k&t=38s>).

The Can Tho ISS objectives were: i) to better know and understand the concepts of ACP, methods and tools for their implementation and jointly exchange the principles of ACP; ii) to engage participants in a collective dynamic of ACP and develop collaborations as well as research projects, with concrete deliverables, videos, articles, and training resources

Co-organized by CIRAD, Can Tho University and INRA, the five-day school was designed to offer participants a better knowledge and understanding of the concepts of ACP, introduce methods and tools for its implementation, enhance relationships between researchers from various disciplines (Soil Sciences / Phytopathology / Entomology / ..., and encourage discussions to create a collective ACP dynamic and develop collaborations as well as research projects with concrete deliverables, videos, articles and training resources.

The lecturers of the International Scientist School on ACP were: Dr Jean-Noël Aubertot (INRA, France), Dr Philippe Cao Van (Cirad, Laos), Dr Jean-Philippe Deguine (CIRAD, Réunion), Dr Duong Minh Vien (CTU, Vietnam), Pr Le Van Vang (CTU, Vietnam), Dr Nguyen Thi Ngoc Truc (Sofri, Vietnam), Dr Pham Thi Sen (Nomafsi, Vietnam), Dr Philippe Tixier (Cirad, France), Dr Kris Wyckhuys (Asia Entomology, Vietnam/China). In addition, Dr Sen (Nomafsi) gave a presentation on Conservation Agriculture in South East Asia. 25 participants from different countries of South East Asia and 8 lecturers attended this International Scientist School.

The school included lectures on ACP, explaining the principles and examples of its successful employment, lectures and group work on modelling, a field visit, an examination of ACP research topics and case studies (banana, rice and mango, for example) and a final day drawing conclusions. Some of the take-home messages from the participants included the fact that ACP can be applied in the future in the region, qualitative modelling is a very useful approach for considering ‘complexity’, interdisciplinarity will be necessary to develop ACP and that soil health and biodiversity are the two main axes of ACP.

At the end of the ISS, a USB key was given to each participant, containing all the presentation files, a set of targeted publications and some photos.

The highlights of the ISS were published and sent to all the participants and placed on the CANSEA website. See annex 6.

- Deguine J.-P., 2018. Highlights of the International Scientist School on Agroecological Crop Protection. Can Tho, Vietnam, 11-16 March 2018, 29 pp.

#### **Scientific visit of two Vietnamese colleagues in CIRAD Réunion (3-27 June 2018)**

At the end of the project, two researchers of Vietnam, Dr Nguyen Thi Ngoc Truc (SOFRI) and Dr Dinh Thi Yen Phuong (IFAM) conducted a scientific visit to La Réunion (France) in June 2018 (3-27), in order to appreciate the concrete results on applying ACP in Reunion Island, to exchange, to implement deliverables (such as documents and movies) and to identify future axes of collaborations. In this respect, a proposal of collaboration, including a proposed assignment of Dr Deguine to South Vietnam, was discussed and built (annex 7). Moreover, two concepts notes on Research &

Development projects have been written and fields of collaborations have been identified between Vietnamese teams and Cirad teams.

### **Identifying future collaborations in SEA**

During the three Workshops and the International Scientist School held in Vietnam and Myanmar, concrete collaborations between participants have been identified. Firstly, the aim of collaborations was to exchange and to have the same level of information on Agroecological Crop Protection. In this respect, structures of collective papers, brochures, flyers and posters have been co-designed and implemented, both in English and in Vietnamese. In addition, for some of them, in Khmer, Burmese and Lao.

For example, Can Tho ISS participants have designed a collective brochure on ACP (see Action 2). In addition, during the Can Tho ISS, participants also identified some future challenges such as the links between ACP concepts and policies and improving the connection between soil health and biodiversity. Some actions and themes discussed during the school will be the focus of participants' research work, including topics such as biodiversity, soil health, sanitation, augmentorium use, biological control, cover crops, modelling, qualitative modelling, bioagents and organic agriculture.

### **Participation of six SEA colleagues to the ACTAE final conference held in Siem Reap (Cambodia), 8-11 November 2018**

To get a strong regional partnership for ACP, 6 colleagues who have been involved in activities to promote Agroecological Crop Protection in SEA, attended the Regional Conference on Agroecology (Siem Reap, Cambodia, 08 to 11 November 2018) : Mr Thisadee Chounlamountry (from Laos), Dr Nwe Nwe Yin (from Myanmar), Dr Nguyen Thi Ngoc Truc, Dr Dinh Thi Yen Phuong and Prof Le Van Vang (Vietnam) and Mr Sereyboth (from Cambodia). They have presented the results and the deliverables of the Agroecological Crop Protection project.



### **Movies (ISS Can Tho, Twin ISS, Weaver ants)**

- Presentations in ISS Can Tho

All the 31 lectures and presentations of the ACP International Scientist School held in Can Tho in March 2018 have been captured. The videos were made in Can Tho by Dr Guy Lambert (Aix Marseille University) and edited in La Réunion by Louis Juigner (a student of this University), with the support of Dr Jean-Philippe Deguine. The movies are now available on the Internet ([www.agriculture-biodiversite-oi.org/en/ACP-ACTAE](http://www.agriculture-biodiversite-oi.org/en/ACP-ACTAE); <http://cansea.org.vn>) (see annex 8) and on the YouTube channel: [https://www.youtube.com/channel/UCBhvIsesc2neAQpg7nbw1iQ/videos?view\\_as=subscriber](https://www.youtube.com/channel/UCBhvIsesc2neAQpg7nbw1iQ/videos?view_as=subscriber)

- Twin International Scientist Schools: Volterra (Italy) and Can Tho (Vietnam)

In addition, to stress the consistence and the links between the Twin International Scientist Schools (Volterra and Can Tho), a short movie (5') has been edited. This movie is starring an active participant, attending as a student the first ISS and attending as a lecturer the second one. This movie is also a deliverable of the useful ISS. This movie is now edited to be available on the Internet ([www.agriculture-biodiversite-oi.org/en/ACP-ACTAE](http://www.agriculture-biodiversite-oi.org/en/ACP-ACTAE); <http://cansea.org.vn>) and on YouTube (<https://www.youtube.com/watch?v=9sjK2fkCz7k&t=38s>) (see annex 9).

- Movies on using weaver ants in citrus orchards in Vietnam

Other important movies (in Vietnamese, English and French) delivered in the ACP-ACTAE project focused on the role of weaver ants in South Vietnam. The oldest example of ACP pertains to the conservation of weaver ants (*Oecophylla smaragdina*) by farmers in ancient China and Vietnam, to control insect pests in citrus orchards. To share this traditional knowledge on the Biological Control example still effective, we met three farmers in South Vietnam (two small-scale farmers and one commercial farmer). After filming their experiences (by Dr Guy Lambert, Aix Marseille University), a film was edited in the following months with the support of Louis Juigner, Drs Jean-Philippe Deguine (Cirad), Dr Nguyen Thi Ngoc Truc (SOFRI) and Dr Dinh Thi Yen Phuong (IFAM). This movie is now available in three languages (Vietnamese, English, and French) and can be used to share with farmers and other sectors, the use of weaver ants in the agroecological management of citrus orchards.

These movies are now edited to be available on the Internet ([www.agriculture-biodiversite-oi.org/en/ACP-ACTAE](http://www.agriculture-biodiversite-oi.org/en/ACP-ACTAE); <http://cansea.org.vn>) (see annex 10) and on the YouTube channel: [https://www.youtube.com/channel/UCBhvIsesc2neAQpg7nbw1iQ/videos?view\\_as=subscriber](https://www.youtube.com/channel/UCBhvIsesc2neAQpg7nbw1iQ/videos?view_as=subscriber)

### **Creation of a YouTube channel: Agroecological Crop Protection Network**

A YouTube channel “ACP.ACTAE” has been created to host the movies of the project: [https://www.youtube.com/channel/UCBhvIsesc2neAQpg7nbw1iQ/videos?view\\_as=subscriber](https://www.youtube.com/channel/UCBhvIsesc2neAQpg7nbw1iQ/videos?view_as=subscriber)

### **Web Page for ACP-ACTAE resources**

At the end of the project, a Web page was designed and implemented in order to receive the numerous deliverables and resources of the ACP-ACTAE project. This Web page is hosted by the Website <http://www.agriculture-biodiversite-oi.org/en> (the web portal for Indian Ocean agriculture and biodiversity). This deliverables will also appear on CANSEA website (<http://www.cansea.org.vn>).

- Flyers, posters: 2 Flyers on Main Fruit Fly in Vietnam (English, Vietnamese), 5 posters on conservation biological control (English, Vietnamese), 1 poster on beneficials (English, Vietnamese)
- Brochure: 1 brochure on Agroecological Crop Protection in South East Asia (English, Vietnamese, Khmer, Burmese, Lao)
- Minutes: 3 minutes of the ACP Workshops, 1 Highlights of the ACP International Scientist School (English)
- Movies: Weaver ant movie (for professionals, 15'), Golden ant movie (for common people, 5')
- Videos on presentations during the International Scientist School of Can Tho (Vietnam): 31 videos.

All the movies are available on the YouTube channel:

[https://www.youtube.com/channel/UCBhvIsesc2neAQpg7nbw1iQ/videos?view\\_as=subscriber](https://www.youtube.com/channel/UCBhvIsesc2neAQpg7nbw1iQ/videos?view_as=subscriber)

Some references on Agroecological Crop Protection are given on the Web Page (see Annex 11).

<b>Characteristics of results and deliverables of the ACP-ACTAE project</b>
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The Table 2 summarizes the achievement of the ACP-ACTAE project.

**Table 2. Deliverables of the ACP-ACTAE project (2017-2018)**

<b>Actions</b>	<b>Activities</b>	<b>Deliverables</b>	<b>Language</b>
Collective papers	in progress	2 structures of collective papers, 1 in Myanmar, 1 in Vietnam	English
Collective brochure	brochure (4 pages)	collective brochure on ACP in SEA (4 pages)	English, Vietnamese, Burmese, Lao, Kmer
Flyers and posters	16 Flyers & Posters	2 Flyers on 2 main Fruit Fly in Vietnam	English, Vietnamese
		5 posters on conservation biological control in Fruit Crops	English, Vietnamese
		1 poster on beneficials	English, Vietnamese
Augmentoriums	Production of samples of augmentoriums	Dozen of augmentoriums in Mekong Delta	
Regional workshops	National WS in North Vietnam (Hanoi, May 2017) - Minutes	Minutes	English
	National WS in Myanmar (Nay Pyi Taw, May 2017) - Minutes	Minutes	English
	Regional WS in South Vietnam My Tho, August 2017) - Minutes	Minutes	English
International Scientist School	International Scientist School in South Vietnam (Can Tho, March 2018) - Highlights	Highlights	English
Identifying future collaboration	Meeting during the International Scientist School + Scientific visit of two Vietnamese colleagues to Réunion	1. Designing the bases of a scientific project in partnership project: Agroecological Crop Protection in Fruits and Vegetables in South Vietnam. 2. 2 concepts notes on partnership projects	English
Golden ants as agents of conservation Biological Control	Field visits in South Vietnam (March 2018)	2 Golden ant movies (for professionals, 14')	English, Vietnamese, French
		2 Golden ant short movies (for common people, 7')	English, Vietnamese, French
International Scientist School Volterra, Italy, February 2018	Attendance of Dr Nguyen Thi Ngoc Truc (Sofri, Vietnam)	1 vidéo Twin ISS on Agroecological Crop Protection	English
International Scientist School Can Tho, March 2018	Valorisation of the presentations	31 videos on the presentations in the ISS (Vietnam) available on the Internet	English
	Twin International Scientis Schools (Volterra, Italy & Can Tho, Vietnam)	see vidéo Twin ISS on Agroecological Crop Protection	English
Scientific exchanges	Scientific visit by Vietnamese colleagues (Drs DINH & NGUYEN), 3-27 June 2018, Réunion Island	1. Report of the scientific visits by the Vietnamese colleagues 2. Concept notes of a collaboration between Cirad and Vietnamese institutions 3. Bases of the assignment of Dr Deguine in Vietnam (from 2020)	English
Attendance ACTAE Conference	Participation of 6 Asian colleagues (involved in ACP-ACTAE project to the Final Conference of the ACTAE project, 5-9 November 2018), Siem Reap (Cambodia): 3 from Vietnam, 1 from Myanmar, 1 from Lao, 1 from Cambodia	Final report (presentations and deliverables) of ACP-ACTAE project; Presentation (ppt) of ACP-ACTAE results	English
YouTube channel	<a href="https://www.youtube.com/channel/UCBhVIsesC2neAQpg7nbw1iQ/videos?view_as=subscriber">https://www.youtube.com/channel/UCBhVIsesC2neAQpg7nbw1iQ/videos?view_as=subscriber</a>	36 ACP Movies of the ACP-ACTAE project	English
Web pages	<a href="http://www.agriculture-biodiversite-oj.org/en/ACP-ACTAE/">http://www.agriculture-biodiversite-oj.org/en/ACP-ACTAE/</a>	informations on ACP and deliverables of the ACP-ACTAE project	English
	<a href="http://cansea.org.vn">http://cansea.org.vn</a>		

## **7. Partnerships and colleagues involved in the ACP dynamics**

### **1. SEA partners involved in the ACP dynamic in SEA**

Myanmar (under the Ministry of Agriculture, Livestock and Irrigation (MoALI))

- Department of Agriculture - DOA (DG, DDG, researchers from Land Use Division and Plant Protection Division, officers from Inle Lake District - Extension Department),
- Department of Agricultural Research – DAR (DG, DDG, Researchers)
- Yezin Agricultural University (Rector, Vice-rectors and professors)
- NGOs.

Laos (under the Ministry of Agriculture and Forestry – MAF)

- DALaM (Department of Agricultural Land Management)
- PPC (Plant Protection Center).

Cambodia

- Royal University of Agriculture;
- CASC (Conservation Agriculture Service Center) under the GDA (General Directorate of Agriculture).

Vietnam

- Research Institutes under the Ministry of Agriculture and Rural Development (MARD): VAAS (*Vietnam Academy of Agricultural Sciences*), SOFRI (Southern Horticultural Research Institute), NOMAFSI (Northern Mountainous Agriculture and Forestry Science Institute), PPRI (Plant Protection Research Institute), SFRI (Soils and Fertilizers Research Institute), FAVRI (Fruit and Vegetable Research Institute)
- Universities: Nong Lam University in Ho Chi Minh City, Can Tho University, Hanoi National University of Education, Hue University of Agriculture and Forestry, Tay Bac University, An Giang University, Tra Vinh University
- Other Vietnamese partners: VOAA (Vietnam Organic Agriculture Association), IFAM (Nu Hoang Institute for Fruit Trees and Macadamia), Lam Dong Sub Plant Protection Department (Dalat), BIO PHAP, HAGL, UNIFARM

International Organizations:

- CIRAD (International Center of Agronomic research for Development),
- CIAT (International Center for Tropical Agriculture),
- ACIAR (Australian Centre for International Agricultural Research),
- CABI (Centre for Agriculture and Biosciences International).

**2. Participants to the 3 Workshops and the Scientist School**

Laos:

- DALaM / MAF: Mr Thisadee Chounlamountry, Dr Olot Sengtaheuanhung
- PPC / MAF: Dr Pheophanh Soysouvanh, Ms Khonesavanh Chittarath, Mr Somkhit Sengsay

Cambodia: Mr Sereyboth Soth (RUA), Mr Vira Leng (CASG-GDA)

Vietnam:

- NOMAFSI / MARD: Dr Pham Thi Sen, Mr Do Trong Hieu, Dr Nguyen Van Thiep, Ms Nguyen Thi Thanh Hai, Ms Nguyen Thanh Thuy
- SOFRI / MARD: Dr Nguyen Thi Ngoc Truc, Dr Tran Thi My Hanh (SOFRI), Dr. Tran Thi Oanh Yen (SOFRI, Vietnam), Mrs Nguyen Khanh Ngoc (SOFRI, Vietnam), Dr Nguyen Van Hoa (SOFRI, Vietnam), Dr. Le Quoc Dien (SOFRI, Vietnam), Mr. Nguyen Thanh Hieu (SOFRI, Vietnam), Ms. Dang Thi Kim Uyen (SOFRI, Vietnam), Dr Vo Huu Thoai (SOFRI, Vietnam), Dr Mai Van Tri (SOFRI-Ba Ria, Vietnam),
- PPRI / MARD: Mr Nguyen Nam Hai, Dr Hang Thi Dao, Dr Lai Tien Dung
- SFRI / MARD: Dr Vu Manh Quyet, Dr Nguyen Duy Phuong
- Other Institutes under MARD: Ms Nguyen Phuoc Cam Lien (VAAS), Dr Nguyen Duy Hung (FAVRI), Dr Pham Thi Hoa (Lam Dong Plant Protection)
- IFAM: Dr Dinh Thi Yen Phuong, Dr Nguyen Minh Chau, Mr Giang Nguyen, Ms Tram Duong, Ms Phuong Vo
- Can Tho University: Pr Le Van Vang, Dr Nguyen Thi Thu Nga, Dr Le Thanh Toan, Dr. Trinh Thi Xuan, Dr Duong Minh Vien, Mrs Lim Ngoc Han
- Nong Lam University – Ho Chi Minh City: Dr Le Khac Hoang, Ms Nguyen Thi Phung Kieu, Dr Tran Van Thinh, Dr Vo Thai Dan

- Other Vietnamese Universities: Mrs Bui Thi Suu (Tay Bac University), Dr Tran Thi Thuy (Hanoi National University of Education), Pr Tran Dang Hoa (Hue University of Agriculture and Forestry), Ms Nguyen Thi Hong Ung (Tra Vinh University), Mr Tran Van Khai (An Giang University),  
Other in Vietnam: Mrs Huynh Dinh Ha Giang (BIO PHAP Company), Mr Ho Tri Thanh (Viet Tay Do company), Mrs Au Bich Lieu (HAGL company), Dr Pham Thi Thuy (Vietnam Organic Agriculture Association),

Myanmar:

Dr Thin Nwe Htwe (MoALI-DOA -LUD), Dr. Kyin Kyin Win (MoALI-DOA-PPD), Dr Nwe Nwe Yin (MOALI-DAR), Dr Khin Myat Soe (MoALI-DOA-LUD), Dr. San San Yi (Extension-DOA), Mrs Ni Ni Htain (PP-DOA), Dr. Yu Yu Min (YAU), Mrs Hla Hla Myint (Horticulture-DOA), Mrs San San Yee (Extension-DOA), Dr Than Than Sein (Organic Agriculture NGO)

International organizations:

Dr Kris Wyckhuys (Asia Entomology, Vietnam ; Zhejiang University, China ; University of Queensland, Australia), Dr Philippe Cao Van (Cirad, France), Dr Jean-Philippe Deguine (CIRAD, France), Dr Philippe Tixier (CIRAD, France), Dr Jean-Noël Aubertot (INRA, France), Dr Oleg Nicetic (ACIAR, Australia), Dr J.-C. de Cambiaire (farmer, France), Dr Arnaud Costa (CABI, Malaysia)

### **3. Links with other institutions and colleagues outside of SEA**

In Asia, links are now established via certain colleagues, especially Dr Kris Wyckhuys, with China (Zhejiang University; International Joint Research Laboratory on Ecological Pest Management, Fuzhou, Fujian) and Australia (University of Queensland). The link between SEA partners and INRA also now exists, in the fields of ACP and modelling.

The ACP-ACTAE project was also the opportunity to participate to some international events in the Region and to communicate with other international colleagues on ACP-ACTAE project:

- International Conference on Organic Agriculture in the Tropics: State of the art, challenges and opportunities. Yogyakarta (Indonesia), August 20-24, 2017
- Biological Control in Asia's Changing Agro-Landscapes. A Hands-on Training Course. Hanoi, Vietnam & Beijing, China, September 2-9, 2017.
- Fifth International Symposium on Biological Control of Arthropods. Langkawi (Malaysia), September 11-15, 2017.



The present R&D grant has been financed by the French Agency for Development (AFD). The ideas and the opinions presented in this document are the ones of its authors and do not represent necessarily those of the AFD.



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**Annex 1. Letter of order ACP-ACTAE project / 2017-2018 / AFD**



**LETTER OF ORDER**

**Letter of order in the Framework of ACTAE regional project  
CANSEA component**

ACTAE is a regional project funded by AFD (French Agency for Development) to develop durable and effective networking mechanisms facilitating synergies among agroecology initiatives. This will involve activities in R&D, training and extension, optimization of existing networks and organization with the objective to enhance knowledge, exchange and capitalization regarding Agroecology approaches.

The ACTAE regional project is being implemented by Cirad and GRET, each organization being in charge of implementing one component of the project, Conservation Agriculture Network in South East Asia (CANSEA) for Cirad and Agroecology Learning alliance in South East Asia (ALiSEA) for GRET.

Cirad is the lead contractor for the first 3 years phase of the project.

Cirad as the coordinator of CANSEA component of ACTAE regional project “Towards Agroecology Transition in the Mekong Region” mobilizes funds to support CA and AE dissemination and effective adoption through involving CANSEA members and partners in R&D activities and maintenance of existing CA/AE sites at regional level.

The competitive grants selection committee selected the proposal “Agroecological Management for Crop Protection (AMCP)” to be funded by the competitive grants proposed by Cirad CANSEA component of ACTAE regional project.

Hereinafter are defined the modalities for the completion of requested activities and their funding ordered by:

- Cirad CANSEA component, hereafter called “CIRAD-CANSEA”, represented by Dr. Patrick D'AQUINO as the CANSEA component coordinator of ACTAE project.  
Email: [daquino@cirad.fr](mailto:daquino@cirad.fr) Phone: +856 20 96 523 566

To

- Dr. Jean-Philippe DEGUINE – Cirad BIOS - UMR PVBMT  
E-mail: [jean-philippe.deguine@cirad.fr](mailto:jean-philippe.deguine@cirad.fr)  
(Noémie POBLADOR (Cirad-Bios) in charge of the agreement management & Virginie AMELINE (Cirad-Bios) in charge of the budget management)

Within the framework of CANSEA component of ACTAE project, **Dr Jean-Philippe DEGUINE** (Cirad BIOS - UMR PVBMT) is requested to conduct an operation of Research and Development “**Agroecological Management for Crop Protection (AMCP)**” as described in attached annex “Terms of references” aimed at promoting agro ecological practices and dissemination.

This action will cover the period from **1<sup>st</sup> January 2017 to 30<sup>th</sup> June 2018** in accordance with the planning described in the proposal registered as “Terms of references”.

**Description of the action:**

Agroecological Management for Crop Protection (AMCP) is the declination of Agroecology to Crop Protection and it is at the crossroad of Agroecology and Crop Protection. It aims at “replacing” chemicals, which have negative effects on the environment and on human health, by the services offered by functional biodiversity above and below soil surface. It is a system of Crop Protection based on the science of Agroecology. By focusing on preventive measures, it aims at establishing a bioecological balance between plant and animal communities within an agroecosystem in order to prevent or reduce the risk of infections or outbreaks of pests’ outbreaks. AMCP is based on 2 axis: i) enhance biodiversity (vegetal/animal) and ii) soil health. It is therefore very consistent and complementary to Conservation Agriculture, devoted to agroecosystem soil management. AMCP is another field of agroecosystem field study and management, devoted to prevention and management of pests. It is now well documented<sup>2</sup>.

The phytosanitary strategy is structured according to the following elements: i) protection based on scientific principles of Agroecology (interactions, ecological functioning); ii) practices based on biodiversity (Jacquot et al., 2014 et 2015), soil health and communities management; iii) priority to preventive measures. The three pillars of implementation of AMCP are sanitation, habitat management and biological control. New scales of intervention are considered, both in terms of space and time in accordance with participatory, global and systemic approaches.

**The purpose of this proposal is to set the first steps towards a skilled pool of resource person/ leaders from research, academia and extension to share knowledge about a new approach within the South-eastern Asia agroecology stakeholders.**

The objective of this proposal is to: 1) Making a state of the art of Crop Protection in the zone and identifying the priority issues of Crop Protection that must be taken into account; 2) Training and information exchanging on AMCP for stakeholders (including regional workshops and the organization of a regional Summer Scientist School); 3) Building the foundation of a ACP medium term project, integrating research, training, education and extension support (including already identified deliverables). The proposal will be implemented in the different countries of ACTAE regional project, with a special emphasis in Vietnam and Myanmar.

Cirad, for ACTAE project CANSEA component, will fund the activities through its own accountant procedures for a total amount of US\$ 33,000 free of bank transfer fees and all taxes included in accordance with the budget described in the ToR (annex 1).

**Payment and supporting documents:**

Payment will be done in three tranches:

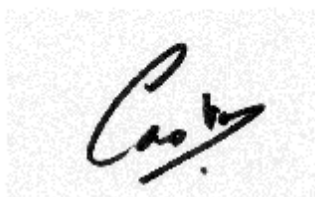
- 1<sup>st</sup> tranche: after finalizing the order (acceptation letter and partnership agreements) an amount of US\$ 16,800 (51% of the total grant) will be served as an advance (corresponding

to the financial support from ACTAE to activities 1 to 3). A request of advance for this amount is needed.

- 2<sup>nd</sup> tranche: after reception of the interim report and a global invoice for the 1<sup>st</sup> tranche, an amount of US\$ 9,600 (29%) will be served. A request of advance for this amount is needed.
- 3<sup>rd</sup> tranche: after reception and validation of the final report and within 30 days, an amount of US\$ 6,600 will be paid as the balance of 20%. A global invoice for the 2<sup>nd</sup> tranche and global invoice for the balance of 20% have to be provided with the final report.

**Remarks :** As for expenses documents, ACTAE just needs a global invoice for each of the three (3) approved tranches of the grant. It remains on the duty of the organization of the proposal leader to store the detail invoices or any documents of expenses and to show them on request of the donor for any control during the period covering the project duration and 10 years after the end of the project.

An acceptance letter from you and a formal engagement of your partners to implement the described action are requested to validate this agreement and before proceeding to the payment of the first advance.



Philippe CAO-VAN  
ACTAE Chief Technical Advisor  
Cirad Laos







**Annex 2. Letter of order ACP-ACTAE project / 2017-2018 / AFD**



**Addendum to the LETTER OF ORDER**  
**To Dr Jean-Philippe DEGUINE – Cirad BIOS – UMR PVBMT**  
**For the implementation of the proposal**  
***“Agroecological Management for Crop Protection (AMCP)”***

**Letter of order in the Framework of ACTAE regional project**  
**CANSEA component**

- According the Letter of Order for the proposal **“Agroecological Management for Crop Protection (AMCP)”** and its acceptance by UMR PVBMT
- According the adjustment of the budget and activities for ACTAE – Cansea under Cirad
- According the demand for a complementary budget from AMCP to finalize the budget for the implementation of the International Scientist School to be held in Can Tho, Vietnam from 11 to 16 March 2018, and some R&D activities
- According the ANO from AFD for this demand

Cirad, for ACTAE project CANSEA component, will fund the complementary activities through its own accountant procedures for a total amount of **EUR 23 500,00** free of bank transfer fees and all taxes included in accordance with the AFD's ANO.

**Description of the action:**

Dans le cadre des «grants» compétitifs sur appel d'offre, nous avons validé en 2016 une proposition intitulée «Agroecological Management for Crop Protection» devant permettre de mettre en œuvre des actions d'information et de formation et construire un partenariat institutionnel autour d'une thématique prometteuse et d'importance dans les pays impliqués dans le projet ACTAE, à savoir le développement de mesures alternatives mettant à profit les approches agro-écologiques pour réduire autant que possible les utilisations anarchiques et dangereuses de produits pesticides, puis travailler ensemble à l'élaboration d'un projet à moyen-long terme. Nous avons déjà conduit trois ateliers (Hanoi au Vietnam, Nay Pyi Taw au Myanmar et My Tho au Vietnam avec une ouverture régionale) qui nous ont permis de rassembler et cribler des scientifiques dans les domaines de la protection des plantes et des sciences du sol. Dans la proposition initiale, nous avions prévu, à la suite de ces ateliers, la conduite d'une Ecole Chercheurs sur cette thématique ACP qui permettra de rassembler à Can Tho (Vietnam) du 11 au 17 mars 2018, en partenariat avec l'Université de Can Tho, une trentaine de chercheurs et enseignants-chercheurs des quatre pays couverts par le projet ACTAE pour approfondir leurs connaissances sur cette approche nouvelle. Le

budget initial n'était pas complètement finalisé et il nous est apparu utile de renforcer le budget de cette action pour mener à bien les différentes activités proposées. Nous souhaitons compléter le budget initial (33 000 USD / 31 500 €) par un budget complémentaire de 23 500 € inscrits dans notre ajustement budgétaire qui a fait l'objet d'un avenant à notre contrat de financement AFD-CIRAD en octobre 2017. Ce budget complémentaire permettra de boucler le financement de l'École Chercheurs et d'engager une action de terrain en R&D sur cette thématique ACP.

**Payment and supporting documents:**

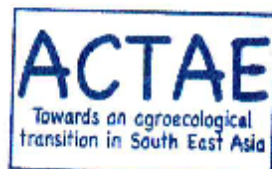
Payment will be done in one tranche for an amount of EUR 23 500,00 following this addendum.

The duration reminds the same as in the initial Letter of order as well as the requested reports.

Done in Vientiane on the 15<sup>th</sup> of January 2018



Philippe CAO-VAN  
ACTAE Chief Technical Advisor  
Cirad Laos





### Annex 3. Collective paper. Example of the Myanmar case

## "Crop Protection in Myanmar: from Agrochemistry to Agroecology?"

Coordination and contribution for the collective paper

Chapter of the paper	Coordinators	Contributors*
Introduction	Philippe Cao Van, Cirad	
1. An expected evolution from Green Revolution to Agroecology	San Yi, Extension, DOA	Than Than Sein, NGO Khin Myat Soe, LUD, DOA Jean-Philippe Deguine, Cirad Aung Zaw Moe, LUD, Shan
2. Chemical Crop Protection and impact	Kyin Kyin Win, PP, DOA	Khin Mya Mya Lwin, PP, DOA Daisy Myint, LUD Khin Su Yee, DOA, San San Lwin, PP, DOA Nilar Moe Swe, Planning, DOA
3. IPM and IPM related experiences and limits	Nwe Nwe Yin, DAR	Si Si Myint, DAR Ni Ni Htein, PP, DOA Yu Yu Min, YAU Moe Hnin Phu, YAU Khin Myat Soe, LUD Jean-Philippe Deguine, Cirad
4. Basis of ACP and perspectives in Myanmar	Jean-Philippe Deguine, Cirad	Thin Nwe Htwe, LUD, DOA Khin Hnin Yu, LUD, DOA Kyin Kyin Win, PP, DOA
Conclusion	Philippe Cao Van, Cirad	

### Structure shared and agreed of the collective paper in Myanmar

#### Introduction

- \* intensive agriculture
  - increasing then decreasing yields
  - negative impacts
  - unsustainability
- \* necessity to change
  - passing Green Revolution
  - towards AE
  - for actors
    - in cluding consumers
- \* In Crop Protection
  - excessive use of pesticides
  - impacts: flora, fauna, environment, water, human
- \* it's the case in MM
  - it's the case in SEA
  - MM is not the largest user of pesticides officially
  - but consumption increases
  - reglementation
    - not well known by farmers
  - illegal pesticides

- reglementation ?
- lot of impacts
- references
- issue to move
- Status of policies in MM
  - cf Peeters et al 2014
- \* objective of the review
  - to make a status of the situation in Crop Protection in MM
    - to review the evolution of Crop Protection in the recent years or decades
    - to list the main limits of current protection
  - to appropriate the need to change in the aims, in the concepts, in the practices
    - from an unsustainable agriculture to a sustainable one
    - with good performances for socio-economical, environmental criteria and also taking into account health and ecology
    - ecology=NEW concern
    - and limiting the use of pesticides

- to identify the keys of the transition period that can help policy makers
- \* announcement of the plan
  - evolution of crop protection
  - chemical CP and impacts
  - IPM and limits
  - ACP and perspectives

## Chapter 1. Evolution of Crop Protection in the recent decades

- \*In the world, in SEA
  - in Asia, evolution of the demand
    - high increase of the demand
    - high increase for cereals
    - fruits and vegetables
    - cf Muniappan et al 2012
  - production losses by pests en particulier en ASE
- \*evolution and status of CP
  - excessive use of pesticides SCHREINEMACHERS et al 2015
    - for a long time: Thailand, VN
    - exponential increase in Cam, Lao, MM
    - in quantity and in quality
  - negative impacts
  - promotion of IPM, training, FFS, but during projects and in some experiences
  - today: IPM is the reference, but limits in considering and practicing
  - unsustainable AES
  - questioning the use of pesticides everywhere
    - ONU
    - not only FAO
    - but also for Human rights
- \*promotion of AE and AE in CP
  - promotion AE
    - ONU de Schutter
    - FAO Rome 2014
    - FAO bangkok 2015
    - ONU human rights 2017
    - 4 for 1000 initiative
  - in CP
    - IPM presented as a way belonging to AE (FAO 2015; Pretty et al 2014)
      - because it could reduce pesticides
      - but unsustainable AES in most of the cases (false IPM, low IPM)
    - ACP Deguine et al 2009 and 2016
    - declension of AE to PC

## Chapter 2. Current Chemical Crop Protection and impacts

- \*worldwide and dominant
  - in developing countries and in developed countries (de Bon Africa)
- \*status of the situation in SEA and MM
  - study of GRET on pesticides used in SEA
  - data
    - evolution of the quantities used during the last 10 years
    - Peeters, DOA
    - data of use, country per country in SEA
    - available in literature
    - situation per crop
    - what are the main problems and what are the way to answer
    - which research axes are implemented?
  - Ccl : evolution
    - increasing
    - cf China production and consumption
- \*farmers are OK with pesticides because
  - no tax on misuse or excessive use
  - biopesticides non available or expensive
  - low knowledge on IPM and on ecology
  - IPM programs rely on projects and funders stop after the project
  - no or few assessment on pesticide risks and no or few studies
- \*negative risks and impacts
  - impacts: flora, fauna, environment, water, human
  - cf litterature
  - references ?
- \*need to significantly reduce pesticides
  - some experiences show it is possible
  - IPM Pretty
  - way of OA
    - some experiences in SEA (Thailand, in MM
    - see presentation ACP WS

## Chapter 3. IPM and IPM related experiences and limits

- \*FAO bangkok 2015
  - IPM = 1 of the 6 AE approaches
  - because it can reduce pesticides
  - but limits
  - cf sustainability
- \*IPM in SEA and MM
  - a lot of papers
  - Pretty et al 2014
  - developed in Asia in the 80s
  - ie Indonesia (FFS)

in MM

description of success stories (rice?)

\*IPM limits

- paradigm of CP for 60 years  
harmonise CC & BC
- today  
promoted in the words  
but often forgotten in practices  
false IPM  
CC easier and cheaper
- low adoption  
in North and South Parsa et al 2014  
in SEA like elsewhere
- numerous definitions  
more than 100: confusions of understanding  
& implementing  
Intelligent Pesticide Management  
no Management of populations
- in the practices : chemicals  
Dugué et al 2016  
chemical = basis of IPM in the fields  
there is a threshold of reduction that we  
cannot reach  
ESR

## Chapter 4. Basis of ACP and perspectives in MM

\*aim: declension of AE in CP

- to take into account the Sustainable Development criteria
- but also two other issues  
health  
cf ONU  
ecology  
AGROECOLOGY!

\*description of ACP

- ordered approach and systemic strategy in the field
- possibility to use pesticides but only on a last resort and carefully

\*positive impacts

- for health, sustainability, environment, socioeconomy

- high reduction of pesticides  
to do our best to not use them  
but possibility at the end

\*what are the priorities or the proposals for ACP in MM?

- crops ?
- areas?
- cropping systems?
- partners?

\*other practices

- GAP
- Organic Agriculture

\*what are the difficulties and the keys of the transition?

- research into questions?  
new perimeters  
new fields  
new tools, new approaches,
- training and teaching
- public support, policies and regulation

## Conclusion

\*need to include AE in CP

- to improve sustainability of AES
- to reduce pesticides  
ESR
- to reduce negative impacts
- AE is in process, including AE in CP

\*generic keys to move

- cf book

\*proposals in MM

- priorities
- to test the principles in the fields
- to manage the transition period
- concrete proposals

\*regulation and implementation could be more efficient

- so better education and training of farmers, extensionists and sales
- if there was alternative to chemicals  
what are we waiting for?  
issue to move to agroecology

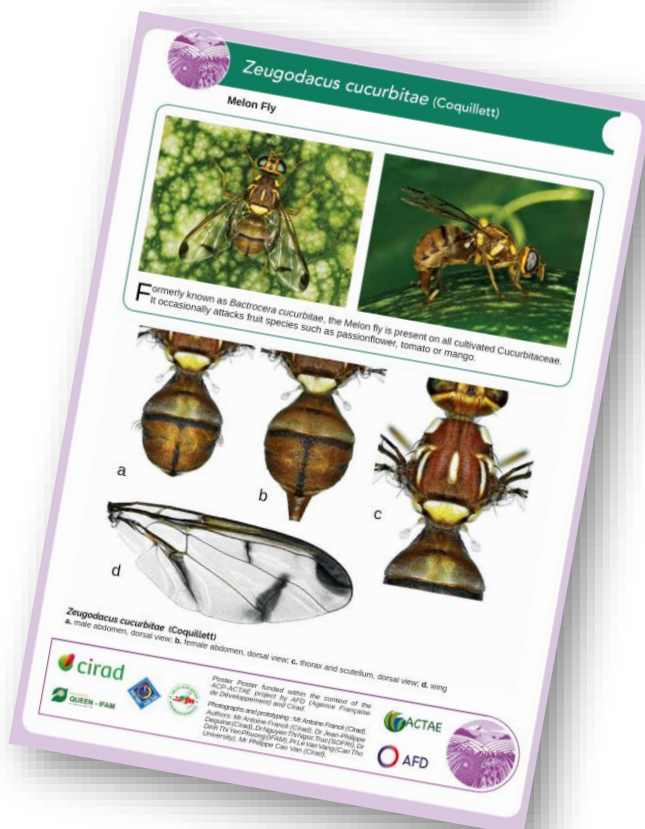


## Annex 4. Examples of deliverables of the action 2 of the ACP-ACTAE project

ACP brochure  
in English (first page)



Fruit Fly flyer



Poster (in Vietnamese)  
on predators in an orchard



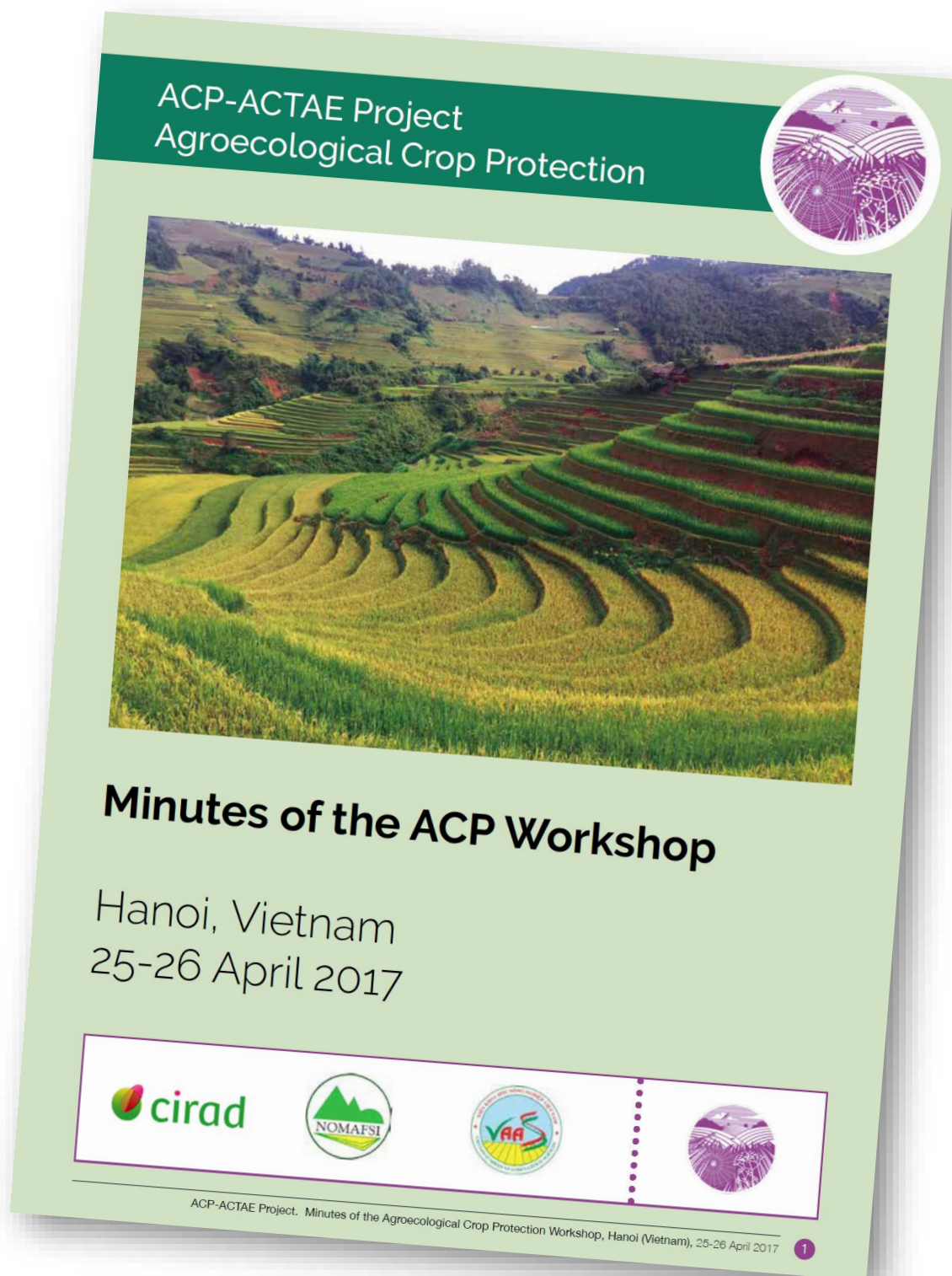
Poster on protecting beneficials

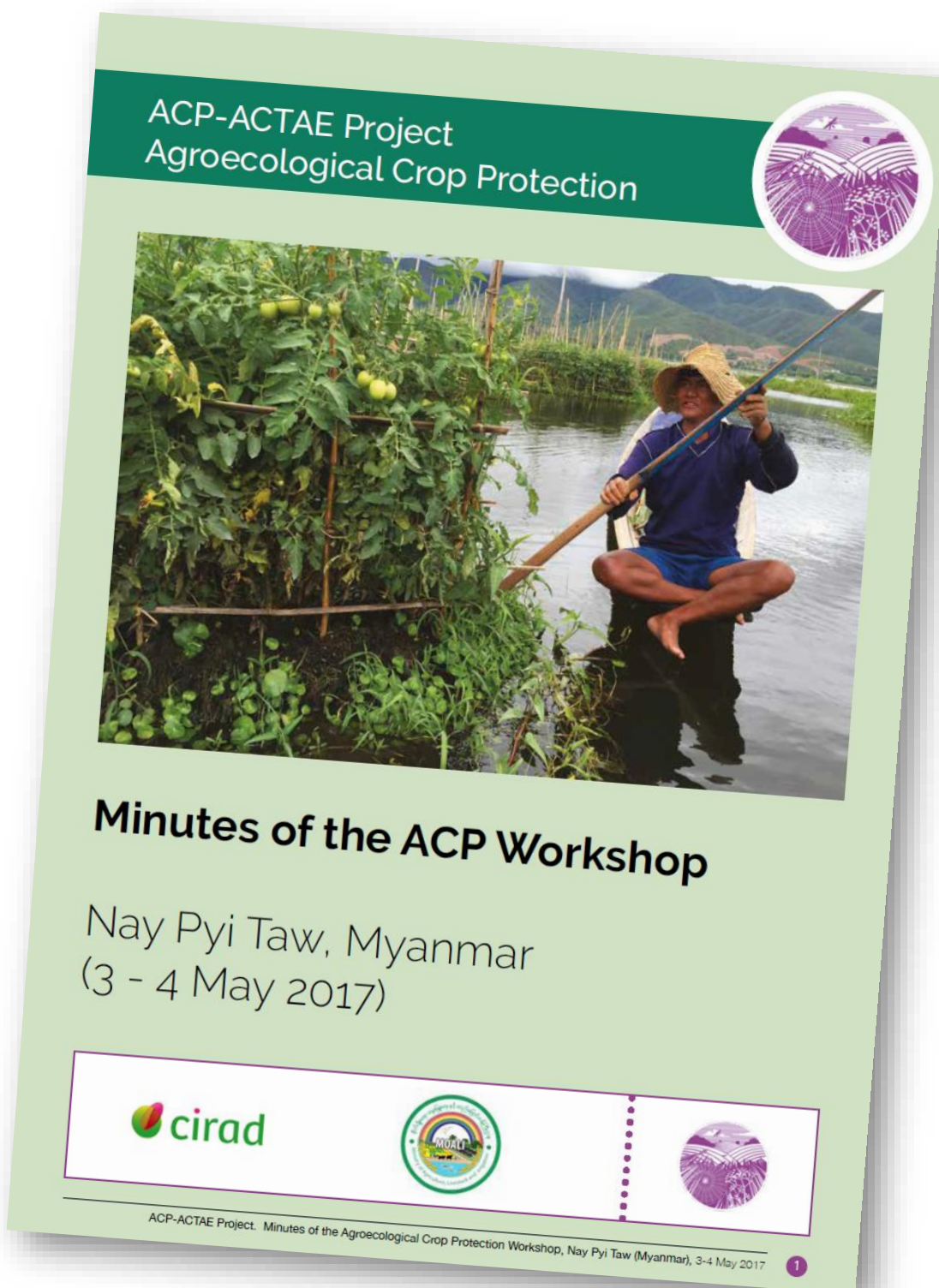




**Annex 5. Minutes of the three ACP Workshops organized in 2017**

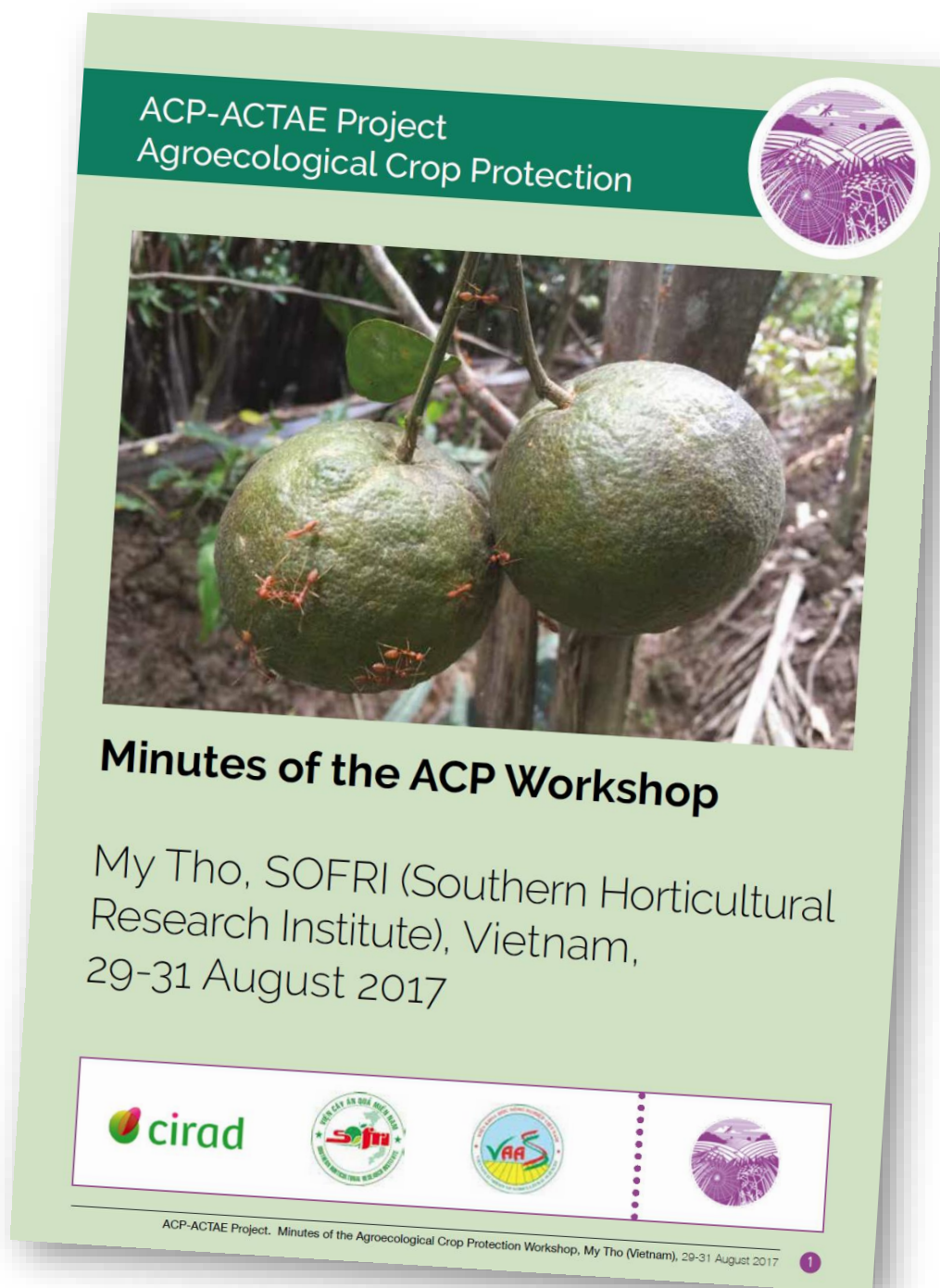
ACP Workshop, Hanoi, Vietnam, 25-26 April 2017 (42 pages)







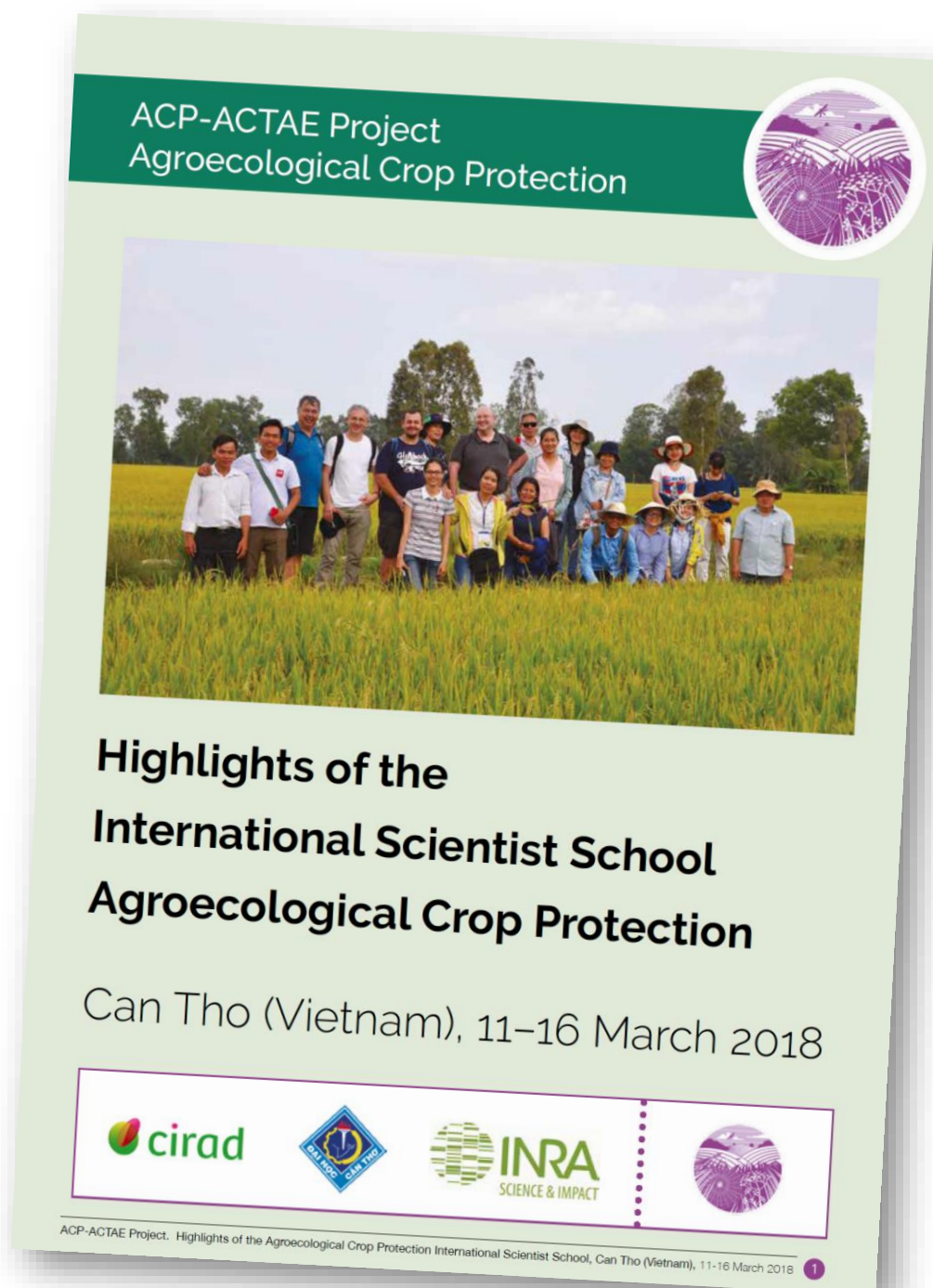
ACP Workshop, My Tho, Vietnam, 29-31 August 2017 (16 pages)





**Annex 6. International Scientist School on ACP in South East Asia, Can Tho, Vietnam, 11-16 March 2018**

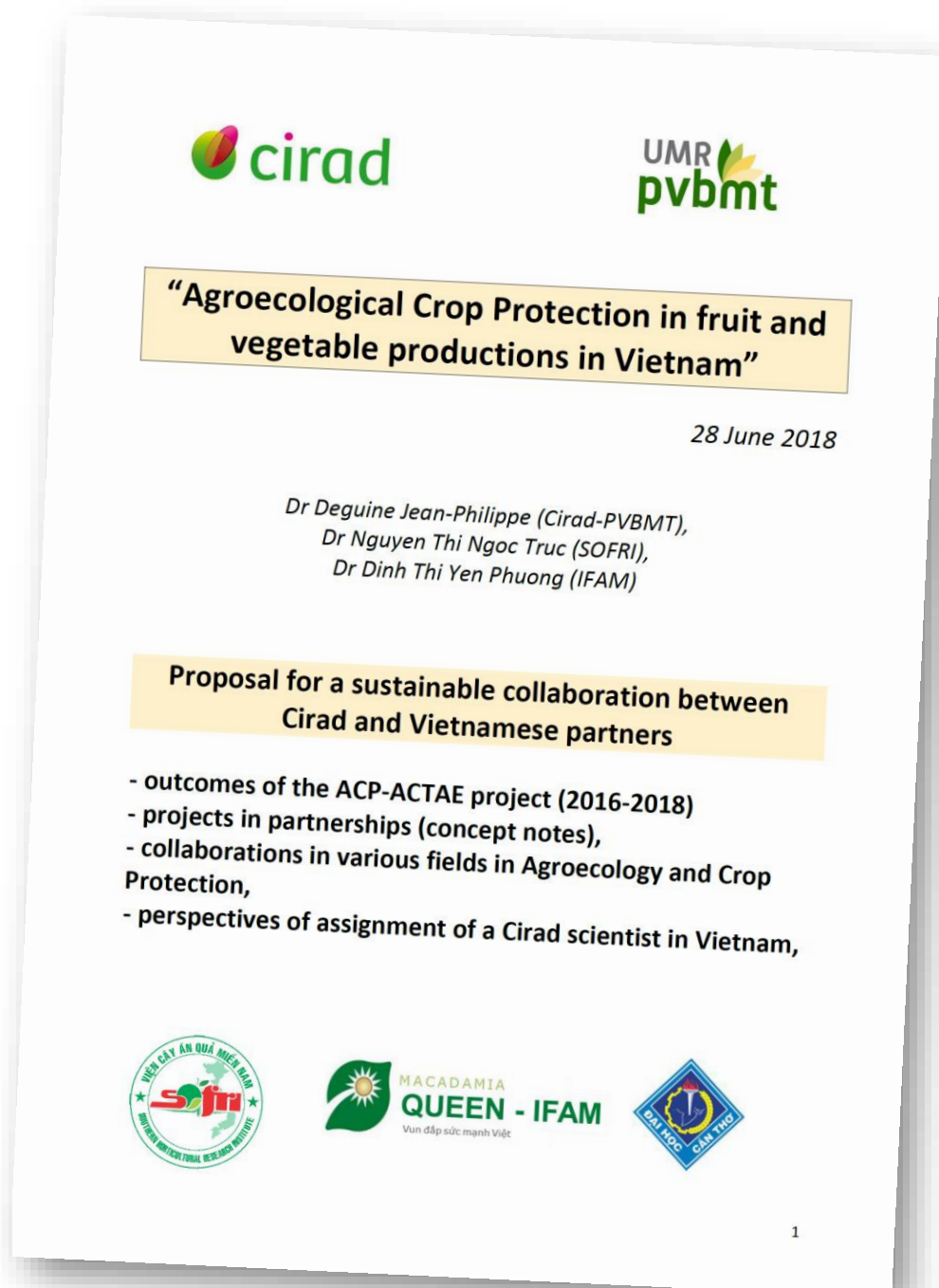
Highlights of the ACP ISS held in Can Tho (March 2018) (29 pp).





**Annex 7. Future collaborations on ACP in SEA**

**Proposal for a sustainable collaboration between Cirad and Vietnamese partners**





**Annex 8. ACP-ACTE / Movies: 31 videos in the ACP International Scientist School (Can Tho, Vietnam, 11-16 March 2018)**

Videos available on the Web page of ACP-ACTAE:

[www.agriculture-biodiversity-oi.org/en/ACP-ACTAE](http://www.agriculture-biodiversity-oi.org/en/ACP-ACTAE)

<http://cansea.org.vn>

Movies also available on YouTube:

[https://www.youtube.com/channel/UCBhvIsesc2neAQpg7nbw1iQ/videos?view\\_as=subscriber](https://www.youtube.com/channel/UCBhvIsesc2neAQpg7nbw1iQ/videos?view_as=subscriber)



2. Objective and conceptual model







**Annex 9. ACP-ACTE / Movie: Twin ACP International Scientist School (Volterra, Italy, February 2018 & Can Tho, Vietnam, March 2018)**

Movie available on the Web page of ACP-ACTAE:

[www.agriculture-biodiversite-oi.org/en/ACP-ACTAE](http://www.agriculture-biodiversite-oi.org/en/ACP-ACTAE)

<http://cansea.org.vn>

Movie also available on YouTube:

<https://www.youtube.com/watch?v=9sjK2fkCz7k&t=38s>





**Annex 10. ACP-ACTE / Movies: Using weaver ants for Biological Control in Vietnam**

Movies available on the Web page of ACP-ACTAE:

[www.agriculture-biodiversite-oi.org/en/ACP-ACTAE](http://www.agriculture-biodiversite-oi.org/en/ACP-ACTAE)

<http://cansea.org.vn>

Movies available on YouTube:

<https://www.youtube.com/watch?v=X3b50n-AFEA&t=4s>

<https://www.youtube.com/watch?v=ygFcP7V0BEU&t=22s>

<https://www.youtube.com/watch?v=fccJtDMACEI&t=2s>

<https://www.youtube.com/watch?v=ERg3dKF0TtU&t=7s>





**Annex 11. Some references on Agroecological Crop Protection**

- Deguine J.-P., Atiama-Nurbel T., Aubertot J.-N., Augusseau X., Atiama M., Jacquot M., Reynaud B., 2015. Agroecological management of cucurbit-infesting fruit fly management. A review. *Agronomy for Sustainable Development*. DOI: 10.1007/s13593-015-0290-5.
- Deguine J.-P., Gloanec C., Laurent P., Ratnadass A., Aubertot J.-N. (eds), 2017. *Agroecological Crop Protection*. Springer Science+Business Media B.V., Dordrecht, 280 p. ISBN 978-94-024-1184-3, DOI 10.1007/978-94-024-1185-0
- Deguine J.-P., Jacquot M., Allibert A., Chiroleu F., Graindorge R., Laurent P., Albon B., Marquier M., Gloanec C., Lambert G., Vanhuffel L., Vincenot D., Aubertot J.-N., 2018. *Agroecological Protection of Mango Orchards in Réunion*. *Sustainable Agriculture Reviews*, 28, Ecology for Agriculture, ISBN: 978-3-319-90308-8, 249-308.
- Deguine J.-P., Ratnadass A., 2017. *Agroecological Crop Protection: At the Interface Between Agroecology, Crop Protection and Biodiversity Management*. In: Deguine J.-P., Gloanec C., Laurent P., Ratnadass A., Aubertot J.-N. (eds), 2017. *Agroecological Crop Protection*. Springer Science+Business Media B.V., Dordrecht, 33-43. ISBN 978-94-024-1184-3, DOI 10.1007/978-94-024-1185-0
- Ferron P., Deguine J.-P. 2005. Crop Protection, biological control, habitat management and integrated farming. *Agronomy for sustainable development*, 25, 17-24.
- Sarthou J.-P., Jacquot M., Deguine J.-P., 2017. *Functional Soil and Aerial Biodiversity*. In: Deguine J.-P., Gloanec C., Laurent P., Ratnadass A., Aubertot J.-N. (eds), 2017. *Agroecological Crop Protection*. Springer Science+Business Media B.V., Dordrecht, 182-187. ISBN 978-94-024-1184-3, DOI 10.1007/978-94-024-1185-0